

WHAT IS CLAIMED IS:

1. A method for manufacturing a gallium nitride compound semiconductor, comprising the steps of:

(a) forming a first gallium nitride compound semiconductor on a substrate;

(b) forming of a composition material of the first gallium nitride compound semiconductor a discrete area on the first gallium nitride compound semiconductor; and

(c) forming a second gallium nitride compound semiconductor on the first gallium nitride compound semiconductor on which the composition material is formed; wherein

a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride compound semiconductor created by the composition material.

2. A method according to claim 1, wherein the first gallium nitride compound semiconductor and the second gallium nitride compound semiconductor are AlGa<sub>N</sub>; and the composition material is Ga or Al.

3. A method for manufacturing a gallium nitride compound semiconductor, comprising the steps of:

(a) forming a base layer on a substrate, the base layer constructed by forming a discrete layer for varying the diffusion lengths of composition materials of a gallium nitride compound semiconductor; and

(b) forming the gallium nitride compound semiconductor on the base layer; wherein

a spatial fluctuation is created in the band gap by creating

a variation in the compositional ratio in the gallium nitride compound semiconductor by varying the diffusion lengths of the composition materials.

5 4. A method according to claim 3, wherein

the gallium nitride compound semiconductor is AlGaN and the layer for varying the diffusion lengths of the composition materials is formed from SiN.

10 5. A method for manufacturing a gallium nitride compound semiconductor comprising the steps of:  
15 (a) forming, on a substrate, a base layer having a lattice mismatch; and  
(b) forming the gallium nitride compound semiconductor on the base layer; wherein  
a spatial fluctuation is created in the band gap of the gallium nitride compound semiconductor by the lattice mismatch.

20 6. A method according to claim 5, wherein  
the lattice mismatch is formed by discretely forming at least one of AlN, InN, AlInGaN, Si, AlGaN, and MgN.

7. A method according to claim 5, wherein  
the gallium nitride compound semiconductor has a superlattice structure of AlGaN and GaN.

25 8. A light emitting element comprising a gallium nitride compound semiconductor, the light emitting element comprising:  
a substrate;

a first gallium nitride compound semiconductor layer formed on the substrate;

a composition material of the first gallium nitride compound semiconductor formed as a discrete area on the first gallium nitride compound semiconductor layer; and

a second gallium nitride compound semiconductor layer having a varied compositional ratio and formed on the first gallium nitride compound semiconductor layer onto which the composition material is formed.

9. A light emitting element according to claim 8, wherein the first gallium nitride compound semiconductor and the second gallium nitride compound semiconductor are AlGa<sub>N</sub>; and the composition is Ga or Al.

10. A light emitting element comprising a gallium nitride compound semiconductor; the light emitting element comprising:

a substrate;

a base layer formed on the substrate and constructed by forming a discrete layer for varying the diffusion lengths of the composition materials of the gallium nitride compound semiconductor; and

gallium nitride compound semiconductor layer having a varied compositional ratio and formed on the base layer.

11. A light emitting element according to claim 10, wherein

the layer for changing the diffusion length of the composition materials is SiN and the gallium nitride compound semiconductor is AlGa<sub>N</sub>.

12. A light emitting element using a gallium nitride compound semiconductor, the light emitting element comprising:

a substrate;

a base layer formed on the substrate and having a lattice

5 mismatch; and

a gallium nitride compound semiconductor layer formed on the base layer and having a spatial fluctuation in the band gap.

13. A light emitting element according to claim 12, wherein

10 the gallium nitride compound semiconductor layer has a superlattice structure.

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